FIRST FIVE-YEAR REVIEW
ODESSA CHROMIUM II SITE
North & South Plumes
Odessa, Ector County, Texas

July 2001

Prepared by:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Region 6
1445 Ross Avenue
Dallas, Texas 75202-2733

FIVE-YEAR REVIEW
Odessa Chromium II Site
North & South Plumes
EPA ID # TXD980697114
Odessa, Ector County, Texas

This memorandum documents approval by the U. S. Environmental Protection Agency (EPA) of the Odessa Chromium II Five-Year Review Report.

Summary of Five-Year Review Findings

The Odessa Chromium II Site includes two contaminated ground water plumes, the South Plume and the North Plume. The remediation goals were achieved in all of the Odessa Chromium II South Plume wells as of December 10, 1999. De-mobilization and decontamination of the treatment plant for the South Plume was completed on February 9, 2001. The Odessa Chromium II North Plume remedy has achieved the remediation goals for all wells in the perched zone, with only one well in the Trinity Aquifer, MW-229, remaining above the remediation goals.

Actions Needed

The remaining contaminated well at the Odessa Chromium II North Plume, MW-229, will be sampled at least three more times because the May sampling event exceeded the remediation goals, apparently due to an operational upset. These sampling events are scheduled for June, July, and August 2001. Once it has been confirmed that the primary drinking water standard has been achieved, the process of cleanup completion will be initiated.

Determinations

I have determined that the remedy for the Odessa Chromium II site, which addresses remediation of chromium-contaminated ground water, is expected to be protective of human health and the environment upon completion, and immediate threats have been addressed.

Pamela Phillips

Myron O. Knudson, P.E.
Director
Superfund Division
U.S. Environmental Protection Agency Region 6

9/25/01
Date

CONCURRENCES

FIVE-YEAR REVIEW

for the
ODESSA CHROMIUM II SITE
North & South Plumes

EPA ID# TXD 980697114

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Remedial Project Manager

Date: 3/20/01

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Date: 4/17/01

By: William K. Honker, Chief
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Date: 4/4/01

By: Anne Foster
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Date: 9/20/01

By: Mark Peycke, Chief
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By: Pam Phillips
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Date: 9/25/01

ACRONYMS AND ABBREVIATIONS

ARAR	Applicable or relevant and appropriate requirements
ATSDR	Agency for Toxic Substances and Disease Registry
BOR	Bureau of Reclamation (U.S. Department of Interior) North Plume
CA	Comprehensive Agreement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant of Concern
ECHD	Ector County Health Department
EPA	Environmental Protection Agency
ERM	Environmental Resource Management (North Plume)
GPM	Gallons per Minute
HASP	Health and Safety Plan
IRM	Initial Remedial Measure
IT	IT Group or IT Corporation (South Plume)
MCL	Maximum contaminant levels
µg/kg	Micrograms per kilogram (parts per billion or ppb)
µg/L	Microgram per liter (ppb)
mg/kg	Milligram per kilogram (parts per million or ppm)
mg/L	Milligram per liter (ppm)
MSL	Mean sea level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
O&M	Operation and maintenance
OU	Operable units
PRP	Potentially responsible party
RAL	Risk action levels
RAP	Remedial Action Plan
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial investigation/feasibility study
ROD	Record of Decision
RPM	Regional Project Manager
SARA	Superfund Amendments and Reauthorization Act
SEQUA	SEQUA Corporation (North Plume)
SOW	Statement of Work
SPE-N	Site Project Engineer-North Plume-Environmental Resource Management
SPE-S	Site Project Engineer -South Plume- Howell Engineering
TAC	Texas Administrative Code
TDWR	Texas Department of Water Resources
TNRCC	Texas Natural Resource Conservation Commission (State-EPA's oversight)
TRRP	Texas Risk Reduction Program

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FIVE-YEAR REVIEW SUMMARY FORMS - North and South Plumes

Five-Year Review Summary Form		
SITE IDENTIFICATION		
Site Name (from WasteLAN): Odessa Chromium II Superfund Site		
EPA ID (from WasteLAN): TXD980340889		
Region: 06	**State:** TX	**City/County: Odessa, Ector**
SITE STATUS		
NPL Status: ☒ Final Deleted ☐ Other (specify) Remedial Action		
Remediation Status (choose all that apply): ☐ Under Construction Operating ☐ A. (North Plume Operational- LTRA) B. (South Plume has Completed Remedial Goals)		
Multiple OUs? ☒ YES	**Construction Completion Date:** North Plume(8/31/94) :South Plume(11/11/93) From Chronology of Events	
Has site been put into reuse? ? YES		
REVIEW STATUS		
Reviewing Agency: ☒ EPA ☒ State ☐ Tribe ☐ Other Federal Agency		
Author Name: Ernest R. Franke, P.E, RPLS, RPM, WAM, Compliance Officer #16842.		
Author Title: Remedial Project Manager	**Author Affiliation:** EPA Region 6	
Review Periods:** See Report respective dates		
Date(s) of Site Inspection: 4/10/2000, 11/15/00 & 2/28/01(interviews)		
Type of review: Policy ☒ Post-SARA Pre-SARA ☐ NPL-Removal only ☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead ☐ Regional Discretion		
Review Number: ☒ **1 (first)** ☐ ; 2 (second) ☐ 3 (third) ☐ Other (specify)		

Triggering Action:****
☐ Actual RA Onsite Construction at OU #
☐ Actual RA Start at OU #
☐ Construction Completion
Previous Five-Year Review Report
x Other (specify) - Treatment plants/systems became and remained operational
Triggering Action Date (from WasteLAN): Revised beginning 3/01/01
Due Date (Five Years After Triggering Action Date): 3/01/2006

Five-Year Review Summary Form

Deficiencies:

No significant deficiencies were identified.

Recommendations and Follow-up Actions:

Consultation with the State's remedial action project manager and the O&M contractor for the Odessa Chromium II South Plume indicate that current O&M procedures have proven effective at maintaining the protectiveness of the remedy at the South Plume.

The remaining contaminated well at the Odessa Chromium II North Plume, MW-219, will be sampled until three sampling events are less than the MCL. These sampling events are scheduled for June, July, and August 2001. Confirmation that the primary drinking water standard has been achieved would initiate the process of cleanup completion.

Protectiveness Statement(s):

The remedy for the site continues to be protective of human health and the environment for the South Plume, and is expected to be protective for the North Plume upon completion.

Next Review: March 2006

Other Comments: None

EXECUTIVE SUMMARY

The United States Environmental Protection Agency (EPA), Region 6, conducted a five-year review of the remedial actions implemented at the Odessa Chromium II Site in Odessa, Ector County, Texas (site). This report documents the results of the review and findings as follows:

- The remedy for the Odessa Chromium II Site is expected to be protective of human health and the environment upon completion, and immediate threats have been addressed.

This report is based on the December 1999 EPA guidance for a five-year review report and provides the following information:

- Site chronology and background
- Status of the remedial actions
- Data analysis of ground water monitoring performed at the site
- Discussion of the protectiveness of the remedial actions
- Site layout and ground water sampling results.

The purpose of five-year reviews is to determine whether the remedy at a site is expected to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review reports. In addition, five-year review reports identify deficiencies found during the review, if any, and recommendations to address them. Although not required by statute, this review is being conducted in accordance with EPA policy. This site was reviewed because, while the remedial action will allow for unlimited use and unrestricted exposure upon completion, the remedy will take longer than five years to complete.

1.0 INTRODUCTION:

The Odessa Chromium II Site, including both the North and South Plumes, is bound approximately by 57th Street on the north, 50th Street on the south, Andrews Highway on the east and a line which extends from Arthur Avenue north to 57th Street and south to 50th Street. The site was added to the National Priorities List in 1984. Two separate, chromium-contaminated ground water plumes were identified at the site. One plume was on the north side of West 54 Street and the second on the south side; the plumes were identified as the North and South Plumes accordingly.

This report was prepared by EPA, Region 6, with the assistance of IT Corporation, the State of Texas' Remedial Action Contract oversight contractor for the South Plume, and ERM-Southwest, Inc., contractor for Sequa Corporation for the North Plume.

1.1 - North Plume:

The North Plume is is located north of 54th Street and is being remediated by Sequa Corporation. On July 15, 1991, EPA entered into a Consent Decree with Sequa Corporation, which provided that Sequa would perform the remedial action for the Odessa II North Plume. Construction activities are documented in Sequa's August 31, 1994, Construction Report. The final inspection of the North Plume remedy construction was conducted on March 11, 1994. There were some continuing operational difficulties with the treatment plant and treatment systems after construction completion.

The North Plume perched zone wells are all below the MCL for chromium and have reached the remediation goals. The EPA issued approval for Sequa to plug and abandon these perched zone wells on March 3, 1999. The principal usable upper ground water aquifer in the area is known as the Trinity Aquifer. Of the remaining North Plume Trinity Aquifer wells, only well MW-229 has yet to meet the remediation goals.

1.2 - South Plume:

The South Plume is located south of 54th Street. The South Plume is a State-Lead site with the lead agency being the Texas Water Commission (TWC) [now known as the Texas Natural Resource Conservation Commission (TNRCC)]. The TNRCC's oversight Engineer is IT Corporation.

Final inspection of the construction of the Odessa II South Plume remedy was conducted on December 11, 1993. In attendance were EPA, TNRCC, TNRCC's Engineer and the contractor. A determination was made that the contractor had performed the construction activities in accordance with the Remedial Design (RD) plans and specifications and the contract amendments.

The Treatment Phase of the original contract ended on December 15, 1997, after 1,465 days of operation. The final remaining well to reach the cleanup level, PRW-28, completed its 90-day standby mode on December 10, 1999.

2.0 SITE CHRONOLOGY

2.1 - North Plume:

Odessa Chromium II, North Plume CHRONOLOGY OF EVENTS	
September 1984	Site added to the NPL
September 1985 - November 1986	Remedial Investigation / Feasibility Study Conducted
March 18, 1988	Record of Decision Issued
January 30, 1991	MCL for Chromium Revised
February 23, 1993	General Construction Contract Documents and Specifications Issued for Bids
March 15, 1993	General Construction Contract Awarded
March 19, 1993	Notice to Proceed with Construction Phase Issued
March 19, 1993	The Construction Phase Begun
August 2, 1993	Initial Plant Start-Up Begins
August 16, 1993	Date of Substantial Completion of Construction Phase
March 30, 1994	Completed Revisions to Plant Filtration, pH Control and Monitoring System; Switched to Different Type of Ion Exchange Resin In Vessels to Permit Longer Run Times
August 31, 1994	EPA Approved Final Construction Report
December 31, 1998	Completed Ground Water Treatment of the Perched Zone
March 3, 1999	EPA Approved Plugging and Abandonment of Perched Zone Wells
October 25, 1999	EPA Issued ESD To Permit Use Of In Situ Ferrous Sulfate Treatment In Trinity Aquifer Wells
December 1, 1999	Initiated In Situ Ferrous Sulfate Treatment Of MW-209, MW-219, And MW-221.
June 26, 2000	Completed In Situ Ferrous Sulfate Treatment Of Trinity Aquifer Well MW-209
August 29, 2000	Completed In Situ Ferrous Sulfate Treatment Of Trinity Aquifer Well MW-221
September 27, 2000	EPA Approved Plugging And Abandonment Of MW-209 And MW-221
December 6, 2000	Completed In Situ Ferrous Sulfate Treatment Of Trinity Aquifer Well MW-219
January 17, 2001	First Of Three Monthly Evaluation Samples At MW-219 Indicated Satisfactory Progress Toward Achievement Of Remedial Goal.

December 6, 2000 to Present	Plant Operated in Standby Mode
April 2001	Sampling at MW-219 Shows Contaminant Levels Above MCL
To Be Determined	Authorization to begin Closure Phase Completion of Closure Phase
To Be Determined	Completion of Closure Phase

2.2 - South Plume:

Odessa Chromium II, South Plume **CHRONOLOGY OF EVENTS**

September 1984	Site added to the NPL
September 1985 - November 1986	Remedial Investigation / Feasibility Study Conducted
March 18, 1988	Record of Decision Issued
January 30, 1991	MCL for Chromium Revised
July 1991	Contract Documents and Specifications Issued for Bids
November 1991	Contract Awarded
November 5, 1991	Notice to Proceed with Construction Phase Issued
November 25, 1991	The Construction Phase Begun (completed in 749 days)
July 28, 1992	Initial Plant Start-Up for 30-day trial begins
7-28-1992 through 11-11-1993	Problems with Injection Well Fouling ends Start-Up Trial
November 11, 1993	Second 30-day Plant Trial start-Up Began
December 11, 1993	Second 30-day Trial Start-Up Completed, Date of Substantial Completion of Construction Phase
December 12, 1993	Notice to Proceed with Treatment Phase
December 11, 1997	Original Treatment Phase Ended after 1,465 days of operation
December 11, 1997	Started Partial Closure Phase
February 14, 1998	Completed Partial Closure Phase and Plant Modifications
February 15, 1998	Started Extended Ground water Treatment of the Perched Zone
December 4, 1998	PRW-20 and PRW-28 Treated with Ferrous Sulfate Solution
December 10, 1998	PRW-20 and PRW-28 Restarted Following Treatment
February 20, 1999	End of PRW-20 90-day Standby Period
April 30, 1999	PRW-28 was retreated with ferrous sulfate, (PRW-20 also retreated as a preliminary step to P&A)

December 10, 1999	90-day Standby Completed for Perched Zone Recovery Well PRW-28
December 10, 1999 to February 2001	Plant Operated in Standby Mode
February 16, 2001	Plant Closure Phase(Building decontaminated and utilities disconnected)
March 2001	Completion of Closure Phase

3.0 BACKGROUND

Woolley Tool and Manufacturing conducted operations generating chromium wastes at its facility on 57th Street and Andrews Highway. A separate facility, located at 5329 Andrews Highway, produced cooling water additives containing chromates from 1950 to 1965, and operations from 1965 to 1969 at that same location generated cleaning vat solutions which also contained chromium. Two contaminated ground water plumes were identified at the site associated with the two facilities described above, the North and South Plumes respectively.

On September 8, 1986, the EPA issued a Record of Decision (ROD) for the first operable unit at the site, selecting a remedy to provide an alternate water supply to persons residing on or near the site. The ROD for the second operable unit at the site describes the remedy to address the chromium-contaminated ground water. The ROD addresses both the North and South Plumes at the site, and was signed on March 18, 1988. A summary of the selected remedy is as follows:

- Extraction of chromium-contaminated ground water from a perched water-bearing zone and the Trinity Aquifer.
- Electrochemical treatment of ground water which exceeds the Primary Drinking Water Standard for chromium;
- Reinjection of the treated ground water into the Trinity Aquifer.
- Monitoring the site for a minimum of 30 years.

The selected remedy eliminates the principal threat posed by the site conditions by eliminating the possibility of human exposure to chromium. On January 1, 1991, the Primary Drinking Water Standard for chromium changed from 0.05 milligrams per liter (mg/l) to 0.10 mg/l total chromium. The site ground water cleanup standard for chromium was revised accordingly, as provided for in the ROD.

The Preliminary Closeout Report (PCOR) for both the North and South Plumes documents that the Environmental Protection Agency and the potentially responsible party (PRP), Sequa Corporation, for the North Plume, and the TNRCC, the Lead Agency for the South Plume, completed construction activities for the Odessa Chromium II site in accordance with OSWER Directive 9320.2-3c. The report was signed on September 9, 1994. Since construction completion, operational problems have led to modifications to both of the North and South treatment plant facilities. The remedy was also modified to include the addition of in-situ ferrous

sulfate treatment after field testing, resulting in an Explanation of Significant Difference (ESD) to the ROD.

4.0 REMEDIAL ACTIONS

4.1 - North Plume:

A Remedial Action Plan (RAP) for electrochemical treatment was approved by EPA in December 1991. On March 25, 1992, Sequa petitioned EPA to change the treatment method from electrochemical treatment to ion exchange, citing lower projected remedial costs and the limited ability of electrochemical treatment to remove chromium at low influent levels. Ion exchange was originally rejected in the ROD due to generation of a hazardous sludge. Electrochemical treatment was selected because it was anticipated that the sludge from this process would be nonhazardous. In Sequa's proposal for ion exchange, the residuals are recycled as opposed to disposed.

The EPA conditionally approved the request to modify the remedy in a letter dated June 12, 1992. Sequa through its contractor, ERM-Southwest, continued to prepare construction drawings and specifications for both the ROD's electrochemical treatment process and the alternate treatment of ion exchange. The EPA allowed the use of the alternate treatment, but it did not allow any change in schedule, and if the alternate did not meet the EPA's Primary Drinking Water Standard for chromium, the PRP would have had to install the electrochemical treatment system. The change to ion exchange treatment is documented in an Explanation of Significant Differences (ESD) signed on June 28, 1994.

Prior to the start of construction, the quality assurance requirements were identified in the RAP, and in general, the quality assurance requirements outlined in the RAP were followed during the construction phase of the work. To monitor and discuss the progress of the work, the Bureau of Reclamation (BOR) provided daily construction oversight and several spot inspections were made by the EPA and the State of Texas (TNRCC). On February 23, 1993, ERM submitted a Construction Quality Assurance Plan. Quality control checks were made and recommendations provided at the contractor's weekly safety meetings. The recommendations included a ramp for the forklift operators, area lighting, and acid containment of bulk acid storage.

For ground water sampling and analysis both at the water treatment facility and from the wells, separate Ground Water Sampling and Analysis Plans were developed. Each plan consisted of a sampling plan and a quality assurance project plan. The BOR performed several split sampling programs with the PRP, using EPA's Contract Laboratory Program. The results of these programs indicated that the sampling and analytical results being generated from the field were unbiased. Routine quality control measures include the completion of a four-page daily inspection log by the operator. These daily reports documented who was on-site, weather conditions, safety concerns, a description of the work performed (i.e., including sampling), which treatment trains were operated and which wells were pumped.

The BOR also provided daily oversight for the first several months of recovery, treatment startup, and operation at the North Plume site. Sampling results at the treatment plant routinely met the Drinking Water Standard, but meeting the three consecutive 30-day individual well tests required by EPA proved highly problematic and unpredictable in the Trinity Aquifer.

After a February 1999 meeting with EPA and TNRCC, Sequa expressed a desire to use in-situ ferrous sulfate treatment on three Trinity Aquifer wells as part of an accelerated effort in meeting its remediation goals. In-situ ferrous sulfate treatment already was being considered by TNRCC and EPA for the South Plume. The EPA issued an ESD for the Odessa Chromium II Site, North and South Plumes, on October 25, 1999, which added the in-situ ferrous sulfate treatment to address residual chromium contamination in the soil and aquifer.

Perched Zone Recovery Wells

In February 1999, EPA Region 6 met with Sequa to discuss the status of the perched zone wells. Sequa demonstrated that, based on historical data and recent sampling results, all the perched zone wells had been successful in meeting the remediation goals. The EPA agreed that all the perched zone wells should be considered to have met the project goals as of December 1998. The EPA deemed perched zone recovery wells MW-214A and MW-223R in compliance with the project goals based on their long-term performance over a period of quarterly sampling extending from December 1993 through December 1998. For the third recovery well, MW-216, Sequa and EPA used three consecutive months of sampling from October 1998 through December 1998 to establish compliance with the project goal.

Sampling dates and analytical results used to verify each well's compliance with the project goal are summarized below:

Perched Zone Recovery Well MW-214A

The total chromium concentration in MW-214A remained below detection limits (<0.02 mg/L) for all but three quarters of the sampling period from December 1993 through December 1998. The three quarters where there were detectable concentrations of chromium were in December 1996 (0.02 mg/L), March 1997 (0.06 mg/L), and in March 1998 (0.02 mg/L). The results from the final three quarters of sampling are provided below.

MW-214A	Jun 98	ND (0.02 mg/L)
	Oct 98	ND (0.02 mg/L)
	Dec 98	ND (0.02 mg/L)

Perched Zone Recovery Well MW-216

The total chromium concentration in MW-216 varied over the sampling period from December 1993 through December 1998. The well appeared to stabilize beginning in June 1998 and the following three quarters of sampling were all below the MCL. MW-216 was sampled monthly

during the last three months of 1998 to verify that it had remained below the MCL for three consecutive months and met the project goals. Results from the final three months of sampling are provided below.

MW-216	Oct 98	0.03 mg/L
	Nov 98	0.05 mg/L
	Dec 98	0.06 mg/L

Perched Zone Recovery Well MW-223R

Similar to MW-214A, the total chromium concentration in MW-223R remained below detection limits (<0.02 mg/L) for all but one quarter of the sampling period from December 1993 through December 1998. The quarter where there was a detectable concentration of chromium was in March 1998 (0.02 mg/L). The results from the final three quarters of sampling are provided below.

MW-223R	Jun 98	ND (0.02 mg/L)
	Oct 98	ND (0.02 mg/L)
	Dec 98	ND (0.02 mg/L)

Trinity Aquifer Recovery Wells

All but one of the Trinity aquifer recovery wells have met the remediation goal based on results from three consecutive monthly samples or from evaluation of the long term performance. Initially, the three Trinity aquifer recovery wells included MW-213, MW-221, and MW-231. Two Trinity aquifer monitor wells, MW-209 and MW-219, were converted to recovery wells in 1999. As of the writing of this report, four of the five Trinity aquifer recovery wells have met the project goal. The EPA approved plugging and abandoning MW-221 and MW-209 in October 2000. Sampling dates and analytical results to verify each well's compliance with the project goal are summarized below:

Trinity Aquifer Recovery Well MW-209

MW-209 was originally installed as a monitor well and had remained below the MCL for most of the quarterly sampling periods since December 1993. In 1999, however, the total chromium concentration in MW-209 began to rise above the MCL. The well was successfully treated in-situ with ferrous sulfate and was determined to be in compliance with the project goal by June 2000. In October 2000 EPA approved plugging the well. Analytical results for the final three consecutive months of sampling are provided below.

MW-209	Apr 00	0.09 mg/L
	May 00	0.09 mg/L
	Jun 00	0.08 mg/L

Trinity Aquifer Recovery Well MW-213

MW-213 was originally installed as a Trinity aquifer recovery well and has remained below the MCL since quarterly sampling began in December 1993. Since March 1995, total chromium in MW-213 has been at or below a concentration of 0.02 mg/L. For most of those quarterly sampling periods, no chromium was detected (<0.02 mg/L). Three months of additional sampling will occur from January 2001 through March 2001 to verify compliance. Analytical results for the three most recent quarters are provided below.

MW-213	Jun 00	ND (0.02 mg/L)
	Oct 00	ND (0.02 mg/L)
	Jan 01	0.01 mg/L

Trinity Aquifer Recovery Well MW-219

MW-219 was originally installed as a monitor well and remained below the MCL for most of the quarterly sampling periods since December 1993. In 1999, however, the total chromium concentration in MW-219 began to rise above the MCL. The well was converted to a recovery well in 1999 and has subsequently undergone three rounds of in-situ ferrous sulfate treatment.

After the third round of treatment was completed in December 2000, the total chromium concentration was 0.1 mg/L. The first of three consecutive months of sampling for determining compliance was completed and showed the concentration to be stable at 0.1 mg/L. The April sampling event, however, showed levels exceeding the MCL, apparently due to an operational upset. The well will be sampled for three more events scheduled for May, June and July, 2001.

Trinity Aquifer Recovery Well MW-221

MW-221 was originally installed as a Trinity aquifer recovery well. Until 1999, the total chromium concentration had remained, for the most part, above the MCL since plant operations began. In 1999 and again in 2000, MW-221 was treated in-situ with ferrous sulfate. The second round of treatment proved successful and as of August 2000, MW-221 had achieved compliance with the project goal. In October 2000, EPA approved plugging the well. Analytical results for the final three consecutive months of sampling are provided below.

MW-221	Jun 00	0.1 mg/L
	Jul 00	0.1 mg/L
	Aug 00	0.1 mg/L

Trinity Aquifer Recovery Well MW-231

MW-231 was originally installed as a Trinity aquifer recovery well. Except for the first quarter of sampling in December 1993, MW-231 has remained at or below the MCL for each quarter of sampling since March 1994. From June 1994 through December 1995, quarterly samples indicated that the total chromium concentration was at or below 0.03 mg/L. From March 1996 onward, the total chromium concentration has remained at or below 0.02 mg/L except for one aberrational sampling event in March 1998 that indicated a concentration of 0.1 mg/L. Based on weekly sampling that had occurred before and after that particular sampling event, it was determined that the plant operator had sampled the wrong well. This was discussed in the quarterly sampling report for that event.

Since March 1998, total chromium in MW-231 has been at or below a concentration of 0.02 mg/L. Three months of additional sampling were scheduled to occur from January 2001 through March 2001 to verify compliance. Analytical results for the three recent quarters are provided below.

MW-231	Jun 00	0.01 mg/L
	Oct 00	ND (0.02 mg/L)
	Jan 01	0.02 mg/L

4.2 - South Plume:

The South Plume is a State lead site, with the remedy being performed by the Texas Water Commission (TWC) [now known as the Texas Natural Resource Conservation Commission (TNRCC)], and TNRCC's oversight Engineer, IT Corporation. Final inspection on the

construction of the Odessa II South Plume remedy was conducted on December 11, 1993. A determination was made that the contractor had performed the construction activities in accordance with the RD plans and specifications and the contract amendments. The site remedy was expected to have a four-year duration, or less, in operating the ground water extraction systems; however, after more than an additional year of extended operations at the site, remediation goals had not been achieved.

The TNRCC proposed, and with EPA's approval conducted, an experimental in-situ ferrous sulfate treatment on the Odessa Chromium II South Plume perched zone recovery wells (PRW-20 and PRW-28) in a three-step process. On December 4, 1998, PRW-20 and PRW-28 were each injected with a mixture of hydrochloric acid followed by concentrated ferrous sulfate solution. The objective was to convert the soluble hexavalent chromium to insoluble trivalent chromium. The precipitation of trivalent chromium would permanently immobilize the chromium.

Both wells dropped below the non-detect level for more than two weeks, with PRW-20 meeting remediation goals. Following the ferrous sulfate treatment, PRW-20 and PRW-28 were restarted on December 10, 1998. PRW-20 was shut off February 20, 1999; the following 90 days of data indicated the chromium concentrations remained below the cleanup level. However, chromium concentrations in PRW-28 rose following the ferrous sulfate treatment to concentrations greater than the cleanup level, but remained approximately 1/4 of the concentration prior to the ferrous sulfate treatment. PRW-28 was retreated with ferrous sulfate on April 30, 1999. As of September 3, 1999 chromium concentrations were below the detection limit. The EPA issued an ESD for the Odessa Chromium II site on October 25, 1999, which added in-situ ferrous sulfate treatment to address residual chromium contamination in the soil and aquifer.

The 90-day standby period for PRW-28 was completed on December 10, 1999. Chromium concentrations in PRW-28 remained below the cleanup level through the standby period. A ground water sample collected from PRW-28 on December 8, 1999 indicated there was no detectable chromium concentration. The attached plots reflect concentrations of total chromium in PRW-20 and PRW-28 following the ferrous sulfate treatment in greater detail.

In December 2000, at the direction of the TNRCC, Howell Engineering prepared a scope of work and solicited bids for the decommissioning and pressure washing of the treatment building. On-site demobilization and decontamination work began on January 24, 2001. It was completed February 2001.

5.0 FIVE-YEAR REVIEW PROCESS & FINDINGS

The EPA performed the five-year review with the assistance of Historical Site Data Records and information furnished on the north plume was by Ronald Grimes, P.E., Project Manager for Environmental Resource Management, Sequa Corporation's Engineer, and on the south plume by Robin Cosgrove, P.E., Project Manager for IT Corporation, the Texas Natural Resource Conservation Commission's Engineer. The EPA Remedial Project Manager responsible for this report is Ernest R. Franke, P.E.. The five-year review was conducted in accordance with EPA's Draft October 1999 Comprehensive Five-Year Review Guidance. The purpose of a five-year review is to determine whether the remedy implemented at the site is protective of human health and the environment.

The Record of Decision (ROD) and the added Explanation of Significant Difference (ESDs) thereto which added in-situ treatment supports the determination that the remedies selected are effective by the following Historical Site Data Records:

5.1 HISTORICAL SITE DATA RECORDS

5.1.1 - North Plume:

Odessa Chromium II North

Chromium Concentrations in Ground water

(a) Perch Zone Data Records

(b) Trinity Aquifer Data Records

Summary of Laboratory Analytical Results

Total Chromium - Perched Zone

Odessa Chromium II Superfund Site North of 54th Street

Odessa, Texas

		Total Chromium Concentrations (mg/L)													
Well No.	Well Type	9/91	12/93	3/94	6/94	9/94	12/94	3/95	6/95	9/95	12/95	3/96	6/96	9/96	12/96
MW-208	Monitor	0.061	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	NS
MW-213A	Monitor	0.066	0.072	0.032	0.028	0.023	0.028	0.03	0.03	0.03	0.03	0.02	0.03	0.03	ND
MW-214A	Recovery	0.247	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.02
MW-216	Recovery	0.195	0.115	0.296	0.782	0.294	0.146	0.08	0.10	0.07	0.02	0.02	0.08	0.09	0.12
MW-220A	Injection	ND	ND	0.021	0.081	0.212 *	0.076	0.08	0.095	0.05	0.08	0.04	0.08	0.05	0.02
MW-222A	Monitor	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-223R	Recovery	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-223A	Monitor	0.02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-224A	Monitor	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-225	Monitor	0.059	ND	ND	ND	0.035	ND	0.02	ND	ND	0.03	ND	ND	ND	0.05
MW-227	Monitor	0.037	ND	0.024	0.045	ND	ND	ND	0.03	ND	0.01	ND	0.03	ND	ND

Well No.	Well Type	3/97	6/97	9/97	12/97	3/98	6/98	10/98	12/98
MW-208	Monitor	NS	NS	NS	NS	0.03	NS	NS	NS
MW-213A	Monitor	ND	ND	ND	ND	ND	ND	ND	ND
MW-214A	Recovery	0.06	ND	ND	ND	0.02	ND	ND	ND
MW-216	Recovery	0.08	ND	0.03	0.02	0.11	0.07	0.03	0.06
MW-220A	Injection	ND	0.14	0.02	ND	0.02	ND	ND	ND

MW-222A	Monitor	ND	ND	ND	ND	ND	ND	ND	ND
MW-223R	Recovery	ND	ND	ND	ND	0.02	ND	ND	ND
MW-223A	Monitor	ND	ND	ND	ND	ND	ND	ND	ND
MW-224A	Monitor	ND	ND	ND	ND	ND	ND	ND	ND
MW-225	Monitor	ND	0.03	ND	ND	0.07	ND	ND	ND
MW-227	Monitor	ND	ND	0.02	ND	0.06	ND	ND	ND

NOTES:

ND - Not Detected, concentration below the Limit of Quantitation (0.02 mg/L).

NS - Not Sampled, well dry

* Resampled October 5, 1994. MW-220A (0.080 mg/L)

Summary of Laboratory Analytical Results

Total Chromium - Trinity Aquifer

Odessa Chromium II Superfund Site North of 54th Street

Odessa, Texas

		Total Chromium Concentrations (mg/L)														
Well No.	Well Type	9/91	12/93	3/94	6/94	9/94	12/94	3/95	6/95	9/95	12/95	3/96	6/96	9/96	12/96	3/97
E-2069	Domestic	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
E-2070	Domestic	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	NS	ND
E-2156	Domestic	0.033	0.036	0.063	0.038	0.032	0.042	0.03	0.03	0.03	0.02	ND	0.03	ND	ND	ND
E-2175	Domestic	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.01	ND	ND	ND	ND	ND
MW-204	Monitor	0.051	0.049	0.052	0.032	0.024	0.026	ND	ND	0.02	ND	ND	ND	ND	ND	ND
MW-208A	Monitor	ND	0.03	0.02	ND	0.035	ND	0.03	0.04	0.03	0.05	ND	ND	0.03	ND	ND
MW-209	Monitor	ND	ND	ND	0.022	0.025	ND	0.05	0.04	0.05	0.06	0.08	0.06	0.07	0.08	0.09
MW-210	Injection	ND	0.091	0.057	0.042	0.048	0.096	0.09	0.02	0.03	0.02	0.03	0.03	0.02	0.04	0.09
MW-213	Recovery	0.135	0.039	0.039	0.041	0.035	0.027	0.02	0.02	0.02	0.02	ND	ND	ND	ND	ND
MW-214	Monitor	ND	ND	0.035	0.039	0.044	0.031	0.04	0.05	0.06	0.05	0.03	0.03	0.05	0.06	0.05
MW-219	Monitor	0.078	0.061	0.058	0.061	0.067	0.082	0.07	0.07	0.08	0.09	0.08	0.06	0.1	0.11	0.12
MW-220	Monitor	ND	ND	0.072	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-221	Recovery	0.103	0.114	0.068	0.523	0.542	0.351	0.1	0.63	0.08	0.07	0.06	0.09	0.09	0.07	0.23
MW-228	Injection	ND	ND	0.061	0.069	0.092 *	0.038	0.08	ND	ND	0.03	0.05	0.07	0.07	0.04	0.05
MW-229	Injection	0.03	ND	0.056	0.02	0.065	0 41	0.13	0.12	0.05	0.03	0.07	0.04	0.03	0.03	0.09
MW-230	Injection	0.038	ND	0.042	0.021	0.099 *	0.057	0.31 **	0.11	0.03	ND	0.04	0.03	0.03	0.03	0.08
MW-231	Recovery	0.203	0.124	0.073	0.032	0.03	0.032	0.03	0.02	0.03	0.03	ND	0.02	ND	ND	0.02

Well No.	Well Type	6/97	9/97	12/97	3/98	6/98	10/98	12/98	3/99	6/99	9/99	3/00	6/00	10/00	1/01
E-2069	Domestic	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	(e)	(e)	ND	ND
E-2070	Domestic	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

E-2156	Domestic	0.02	0.02	0.02	ND		0.03		ND	ND	0.02	0.02		0.016	0.025	0.017	0.027	0.03
E-2175	Domestic	ND	ND	ND	ND		0.02		ND	ND	ND	ND		0.010	ND	ND	ND	ND
MW-204	Monitor	0.02	ND	ND	ND		ND		ND	ND	0.02	0.015		0.013	0.023	ND	ND	0.02
MW-208A	Monitor	ND	0.03	0.03	0.03		0.04		0.05	0.05	0.05	0.048		0.046	0.051	0.043	0.049	0.05
MW-209	Monitor	0.1	0.08	0.09	0.11		0.09		0.09	0.09	0.10	0.091		0.104	0.050	0.079	NSX	NSX
MW-210	Injection	ND	0.05	0.06	0.13		0.06		0.16	0.11	0.14	0.081		0.068	0.069	0.057	0.036	0.08
MW-213	Recovery	ND	ND	ND	ND		ND		ND	ND	ND	0.013		0.013	0.022	ND	ND	0.01
MW-214	Monitor	0.05	0.03	ND	ND		ND		ND	ND	ND	ND		ND	ND	ND	ND	ND
MW-219	Monitor	0.13	0.13	0.14	0.17		0.15		0.16	0.16	0.17	0.174		0.164	ND	0.111	0.244	0.13
MW-220	Monitor	ND	ND	ND	ND		ND		ND	ND	ND	ND		ND	ND	0.012	0.020	0.03
MW-221	Recovery	0.06	0.34	0.06	0.10		0.27		0.18	0.22	0.27	0.256		0.171	ND	0.102	NSX	NSX
MW-228	Injection	0.08	0.02	0.06	0.08		0.06		ND	0.05	0.05	0.138	(d)	0.088	0.036	0.013	0.118 (e)	0.11
MW-229	Injection	0.02	ND	0.06	0.04		0.15	(b)	0.06	0.09	0.05	0.04		0.015	0.012	0.046	0.176 (e)	0.20 (e)
MW-230	Injection	ND	0.06	0.06	0.13		0.12		0.08	0.08	0.09	0.078	(c)	0.077	0.076	0.078	0.079	0.08
MW-231	Recovery	0.02	0.02	0.03	0.11	(a)	0.02		ND	ND	0.02	0.018		0.024	0.018	0.014	ND	0.02

NOTES:

ND - Not Detected, concentration at or below the Limit of Quantitation (0.02 mg/L).

NS - Not Sampled, well inaccessible

NSX - Not sampled, well deleted from program.

* Resampled October 5, 1994: MW-228 (0.063 mg/L); MW-230 (0.051 mg/L).

** MW-230 re-sampled March 29, 1995: total chromium 0.10 mg/l, hexavalent chromium 0.07 mg/L.

(a) Weekly samples collected before and after the 3/10/98 sample consistently had reported concentrations of 0.02 to 0.03 mg/L. Coincidentally, concentrations for recovery well MW-221 consistently had reported concentrations of 0.11 to 0.13 mg/L for the same period. It is suspected that the 3/10/98 sample for MW-231 was mistakenly collected at MW-221 by a plant operator (see text Section 5.3).

(b) MW-229 was resampled on August 29, 1998; 0.03 mg/L total chromium.

(c) MW-230 was resampled on June 25. The original samples was not recorded as received by the laboratory. Since the resampling took place more than 24 hours after the original purging, 200 gallons were purged from the well prior to taking the new sample.

(d) The increased total chromium concentration in MW-228 at the June 1999 sampling event is the result of a plant exceedence in April 1999.

(e) Total chromium level spiked due to operational upset. Subsequent pumping of well has caused well to drop below the MCL.

5.1.2 - South Plume:

Odessa Chromium II South

Chromium Concentrations in Ground Water

Perched Zone				
	Total Chromium Concentrations (mg/l)			
Sample Date	PRW-18	PRW-19	PRW-20	PRW-28
May-92	0.070	0.000	2.670	
Apr-94	0.510	0.120	5.400	
May-94	1.160	0.120	8.830	
Jun-94	0.220	0.180	1.780	
Jul-94	0.250	0.390	0.340	
Aug-94	0.420	0.240	0.210	
Sep-94	NT	NT	NT	
Oct-94	0.210	0.000	1.130	
Nov-94	0.300	0.080	4.280	
Dec-94	0.780	0.090	7.930	
Jan-95	1.280	0.220	4.500	
Feb-95	0.870	0.570	1.450	
Mar-95	1.050	0.479	1.920	
Apr-95	0.653	0.396	1.400	
May-95	0.524	0.347	3.090	
Jun-95	0.393	0.328	2.830	
Jul-95	0.317	0.340	2.730	
Aug-95	0.326	0.263	3.000	
Sep-95	0.260	0.200	2.580	
Oct-95	0.326	0.247	3.170	
Nov-95	0.210	0.220	2.600	
Dec-95	0.092	0.250	3.420	
Jan-96	0.140	0.210	3.400	
Feb-96	0.108	0.134	3.600	
Mar-96	0.079	0.134	3.650	
Apr-96	0.066	0.123	4.01	
May-96	0.058	0.105	2.99	
Jun-96	0.037	0.099	2.27	
Jul-96	0.057	0.085	2.88	
Aug-96	0.037	0.067	3.13	
Sep-96	0.045	0.077	3.1	
Oct-96	0.041	0.051	1.8	
Nov-96	0.081	0.069	0.62	

Sample Date	PRW-18	PRW-19	PRW-20	PRW-28
Dec-96	0.08	0.075	1.525	
Jan-97		0.076	0.879	
Feb-97	0.094	0.066	0.685	
Mar-97	0.086	0.066	0.557	
Apr-97		0.066	0.523	
May-97	0.674	0.039	0.079	0.068
Jun-97	0.072	0.045	0.536	0.457
Jul-97	0.063	0.033	0.541	0.938
Aug-97	0.1	0.02	0.36	1.9
Sep-97	0.062	0.02	0.286	2.35
Oct-97	0.048	0.018	0.236	2.53
Nov-97	0.005	0.005	0.19	1.9
Dec-97	0.005	0.005	0.18	2.2
Mar-98			0.31	0.1
Apr-98			0.55	0.87
May-98			0.26	0.43
Jun-98			0.13	0.38
Jul-98			0.27	0.14
Aug-98			0.27	0.61
Sep-98			0.18	0.85
Oct-98			0.92	1.3
Nov-98			0.14	1.5
12/1/98			0.38	1.6
Ferrous Sulfate Treatment 12-4-98				
12/12/98			*0*	*0*
12/14/98			*0*	*0*
12/16/98			*0.01*	*0*
12/17/98			*0.01*	*0*
12/19/98			*0.02*	*0.01*
12/20/98			*0.03*	*0*
12/21/98			*0.01*	*0*
12/22/98			*0.01*	*0.01*
12/24/98			*0.03*	*0.02*
12/25/98			*0.03*	*0.01*
12/27/98			*0.02*	*0.12*
12/28/98			*0.03*	*0.12*
12/29/98			*0.04*	*0.19*
12/30/98			*0.04*	*0.37*
12/31/98			*0.04*	*0.3*

1/1/99			***0.04***	***0.39***
1/3/99			***0.03***	***0.26***
1/4/99			***0.03***	***0.26***
1/5/99			***0.04***	***0.28***
1/5/99			**0.06**	**1.1**
1/6/99			*0.04*	*0.28*
1/7/99			*0.03*	*0.33*
1/8/99			*0.03*	*0.43*
1/9/99			*0.04*	*0.37*
1/10/99			*0.03*	*0.32*
1/11/99			*0.05*	*0.5*
1/12/99			*0.04*	*0.58*
1/13/99			*0.04*	*0.58*
1/14/99			*0.04*	*0.51*
1/15/99			*0.03*	*0.36*
1/16/99			*0.02*	*0.22*
1/17/99			*0.04*	*0.43*
1/18/99			*0.04*	*0.4*
1/19/99			*0.01*	*0.44*
1/20/99			*0.04*	*0.37*
1/22/99			*0.04*	*0.32*
1/23/99			*0.04*	*0.45*
1/25/99			*0.04*	*0.32*
1/26/99			*0.02*	*0.35*
1/27/99			*0.03*	*0.38*
1/28/99			*0.03*	*0.38*
1/29/99			*0.02*	*0.4*
1/30/99			*0.04*	*0.36*
1/31/99			*0.04*	*0.36*
2/2/99			**0.06**	**0.88**
2/3/99			*0.01*	*0.16*
2/4/99			*0.04*	*0.41*
2/5/99			*0.03*	*0.41*
2/6/99			*0.04*	*0.23*
2/8/99			*0.01*	*0.08*
2/9/99			*0.03*	*0.15*
2/11/99			*0.04*	*0.06*
2/12/99			*0.04*	*0.58*
2/13/99			*0.04*	*0.33*
2/14/99			*0.03*	*0.43*
2/15/99			*0.04*	*0.39*
2/16/99			*0.02*	*0.3*
2/17/99				*0.42*

2/18/99				*0.65*
2/19/99				*0.61*
2/20/99				*0.53*
2/21/99				*0.43*
2/22/99				*0.23*
2/23/99				*0.31*
2/24/99				*0.51*
2/25/99				*0.53*
2/27/99				*0.58*
2/28/99				*0.8*
3/1/99				*0.94*
3/2/99			**0.07**	**2.4**
3/2/99				*1.1*
3/3/99				*1.18*
3/4/99				*1.18*
3/5/99				*1.18*
3/20/99				*1*
3/21/99				*1*
3/22/99				*1*
3/29/99				*0.2*
3/30/99				*0.4*
3/31/99				*0.6*
4/1/99			*0.05*	*1.2*
4/1/99			*0.01*	*1.2*
4/1/99			*0.07*	*1.2*
4/1/99			*6.5*	*1.2*
4/2/99			*0.07*	*0.6*
4/2/99			**0.05**	
4/3/99				*1.2*
4/4/99				*0.74*
4/5/99				*1*
4/6/99			**0.05**	**1.6**
4/6/99				*0.4*
4/7/99				*0.8*
4/8/99				*1*
4/9/99				*0.52*
4/10/99				*0.4*
4/12/99				*0.6*
4/13/99				*0.8*
4/14/99				*1.8*
4/15/99				*0.8*
4/17/99				*0.8*
4/18/99				*0.8*

4/19/99				*0.8*
4/20/99				*0.8*
4/21/99				*0.8*
4/22/99				*0.35*
4/23/99				*0.56*
4/24/99				*0.25*
4/25/99				*0.8*
4/26/99				*0.6*
4/28/99				*0.6*
4/29/99				*0.8*

PRW-28, 2nd ferrous treatment beginning 4-30-99

7/5/99				**<0.05**
7/27/99				**<0.05**
8/3/99				**<0.05**
9/7/99				**<0.05**
10/12/99				**<0.05**
11/2/99				**<0.05**
12/8/99				**<0.05**

Note: Laboratory data shown as bold text, field data shown as italics text.

Trinity Aquifer

	Total Chromium Concentrations (mg/l)					
Sample Date	RW-12	RW-13	RW-14	RW-15	RW-16	RW-17
May-92	1.110	0.070	0.260	0.780	0.450	0.540
Feb-94	0.550		0.500	0.110	0.490	0.570
Mar-94	0.400		0.500		0.490	0.580
Apr-94	0.260	0.070	0.500	0.070	0.330	0.480
May-94	0.230	0.000	0.400	0.000	0.210	0.340
Jun-94	0.220	0.100	0.460	0.080	0.220	0.450
Jul-94	0.140	0.000	0.320	0.000	0.140	0.470
Aug-94	0.200	0.300	0.380	0.000	0.200	0.370
Sep-94	0.140	0.090	0.280	0.000	0.110	0.410
Oct-94	0.000	0.050	0.230	0.000	0.100	0.320
Nov-94	0.180	0.170	0.230	0.000	0.140	0.390
Dec-94	0.110	0.060	0.250	0.000	0.090	0.420
Jan-95	0.070	0.070	0.230	0.000	0.130	0.170
Feb-95	0.000	0.068	0.220	0.000	0.060	0.230
Mar-95	0.052	0.051	0.190	0.006	0.083	0.202
Apr-95	0.044	0.043	0.167	0.006	0.073	0.173
May-95	0.044	0.231	0.178	0.007	0.075	0.169
Jun-95	0.043	0.050	0.183	0.015	0.061	0.167
Jul-95	0.041	0.052	0.156	0.006	0.073	0.158
Aug-95	0.039	0.091	0.144	0.009	0.058	0.151
Sep-95	0.025	0.149	0.142	0.000	0.049	0.136
Oct-95	0.018	0.145	0.138	0.000	0.056	0.122
Nov-95	0.007	0.076	0.120	0.003	0.030	0.120
Dec-95	0.006	0.079	0.118	0.000	0.028	0.093
Jan-96	0.006	0.041	0.110	0.000	0.025	0.081
Feb-96	0.007	0.079	0.102	0.004	0.024	0.069
Mar-96	0.005	0.074	0.102	0.000	0.018	0.059
Apr-96	0.005	0.053	0.097	0	0.026	0.053
May-96	0.005	0.077	0.082		0.013	0.042
Jun-96	0.005	0.081	0.078		0.015	0.039
Jul-96	0.005		0.077	0	0.013	0.038
Aug-96	0.006	0.078	0.067	0.003	0.024	0.034
Sep-96	0.005	0.044	0.068	0.001	0.018	0.033
Oct-96	0.005	0.037	0.062	0.001	0.017	0.031
Nov-96	0.004	0.028	0.062	0.001	0.013	0.028
Dec-96	0.005	0.029	0.074	0.001	0.018	0.03
Jan-97	0.004	0.027	0.057	0.0005	0.013	0.026
Feb-97	0.004	0.027	0.066	0.0005	0.013	0.025

Sample Date	RW-12	RW-13	RW-14	RW-15	RW-16	RW-17
Mar-97	0.003	0.027	0.052	0.001	0.012	0.026
Apr-97	0.004	0.029	0.052	0.001	0.013	0.022
May-97	0.003	0.025	0.053	0.002	0.011	0.022
Jun-97	0.004	0.027	0.052	0.002	0.01	0.021
Jul-97	0.005	0.028	0.056	0.003	0.012	0.022
Aug-97	0.005	0.016	18	1.1	0.009	0.02
Sep-97	0	0.057	0.047	0	0.011	0.014
Oct-97	0.005	0.078	0.066	0.004	0.022	0.012
Nov-97	0.005	0.07	0.06	0.005	0.005	0.005
Dec-97	0.005	0.005	0.06	0.005	0.005	0.005
Mar-98						
Apr-98						
May-98			<0.05			
Jun-98			<0.05			
Jul-98			<0.01			
Aug-98			<0.01			
Sep-98			0.03			
Oct-98			<0.05			
Nov-98			<0.05			
12/1/98			<0.05			
1/5/99			<0.05			
2/1/99			<0.05			
3/2/99			<0.05			
4/6/99			<0.05			
7/5/99			<0.05			
7/27/99			<0.05			
8/3/99			<0.05			
9/7/99			<0.05			
10/4/99			<0.05			
11/1999			<0.05			

Note: Laboratory data shown as bold text, field data shown as italics text.

Additional Reviews and Activities:

In addition to the data evidenced above, the five year review consisted of the following activities: (1) a review of the relevant documents, (2) site inspections and (3) interviews with knowledgeable field and office staff in-charge of site activities and site events. Because of excellent communication by the field staff, low neighborhood concern and interest, and public support of site operations and management, the TNRCC and EPA found an open house was not warranted. The completed five-year review will be mailed to all of the information repositories upon final signature.

6.0 ASSESSMENTS AND DEFICIENCIES

ASSESSMENTS:

6.1 North Plume & 6.2 South Plume

In accordance with EPA's Five-Year Review guidance the following questions are addressed :

Question A: Is the remedy functioning as intended by the decision documents?

- **Health and Safety Plan ("HASP")/Contingency Plan** - Both the HASP and contingency plan are in place, sufficient to control risks, and properly implemented. All site activities are performed by experienced personnel and supervisory staff.

- **Implementation of Institutional Controls and Other Measures** - No institutional controls are required, because the remedy will address all contamination above health-based levels. Access to the treatment plant property remains limited by fencing and a locked entry gate.

- **Remedial Action Performance** - Remedial actions have been, and will continue to be, effective at the site, and remediation goals are achievable for the site. With the exception of the North Plume well MW-219, the site wells have met remedial cleanup goals, and all wells reflect an appreciable decrease from the initial respective readings. The Remedial Action is performing as designed and enhanced by ferrous sulfate in-situ treatment. Site cleanup appears to be imminent and attainable.

- **Wells Ferrous Sulfate Treatment and Systems Operations/O&M** -

  In-situ ferrous sulfate treatment and the system operational procedures are consistent with ROD requirements.

- **Opportunities for Optimization** - This five-year review does not identify a need for further optimization or further remedy enhancement at this time.

- **Early Indicators That the Remedy is Not Achieving Remediation Goals** - Early indicators that remedial goals were not on schedule previously were noted by the lead agency, TNRCC, on the South Plume. The ferrous sulfate treatment was approved and added to the remedy to accelerate attainment of established remedial goals.

- **Changes in Toxicity and Other Contaminant Characteristics** -There have been no changes in toxicity or other characteristics for the contaminant of concern.

- **Changes in Risk Assessment Methodologies** - Changes in risk assessment methodologies since the time of the ROD do not call into question the protectiveness of the remedy.

Question B: Are the assumptions used at the time of remedy selection still valid?

- **Changes in Standards and to be Considered** - There were no changes in standards which bear on the protectiveness of remedy. Ferrous sulfate in-situ treatment was approved through an ESD to the ROD and will be used until the remediation goals are achieved.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy? - No additional information has been identified that would call into question the protectiveness of the remedy after the remedial criteria have been achieved.

DEFICIENCIES: **North & South Plumes** - No significant deficiencies were identified.

RECOMMENDATIONS AND FOLLOW-UP ACTIONS: North & South Plumes

Consultation with the State's remedial action project manager and the O&M contractor for the Odessa Chromium II South Plume indicate that current O&M procedures have proven effective at maintaining the protectiveness of the remedy at the South Plume.

The remaining contaminated well at the Odessa Chromium II, North Plume, MW-219, will be sampled until three sampling events are less than the MCL. These sampling events are scheduled for June, July, and August 2001. Confirmation that the primary drinking water standard has been achieved would initiate the process of cleanup completion.

PROTECTIVENESS STATEMENT North & South Plumes

This report constitutes a determination that the remedy for the Odessa Chromium II site, which addresses remediation of chromium-contaminated ground water, is expected to be protective of human health and the environment upon completion, and immediate threats have been addressed.

NEXT REVIEW North & South Plumes

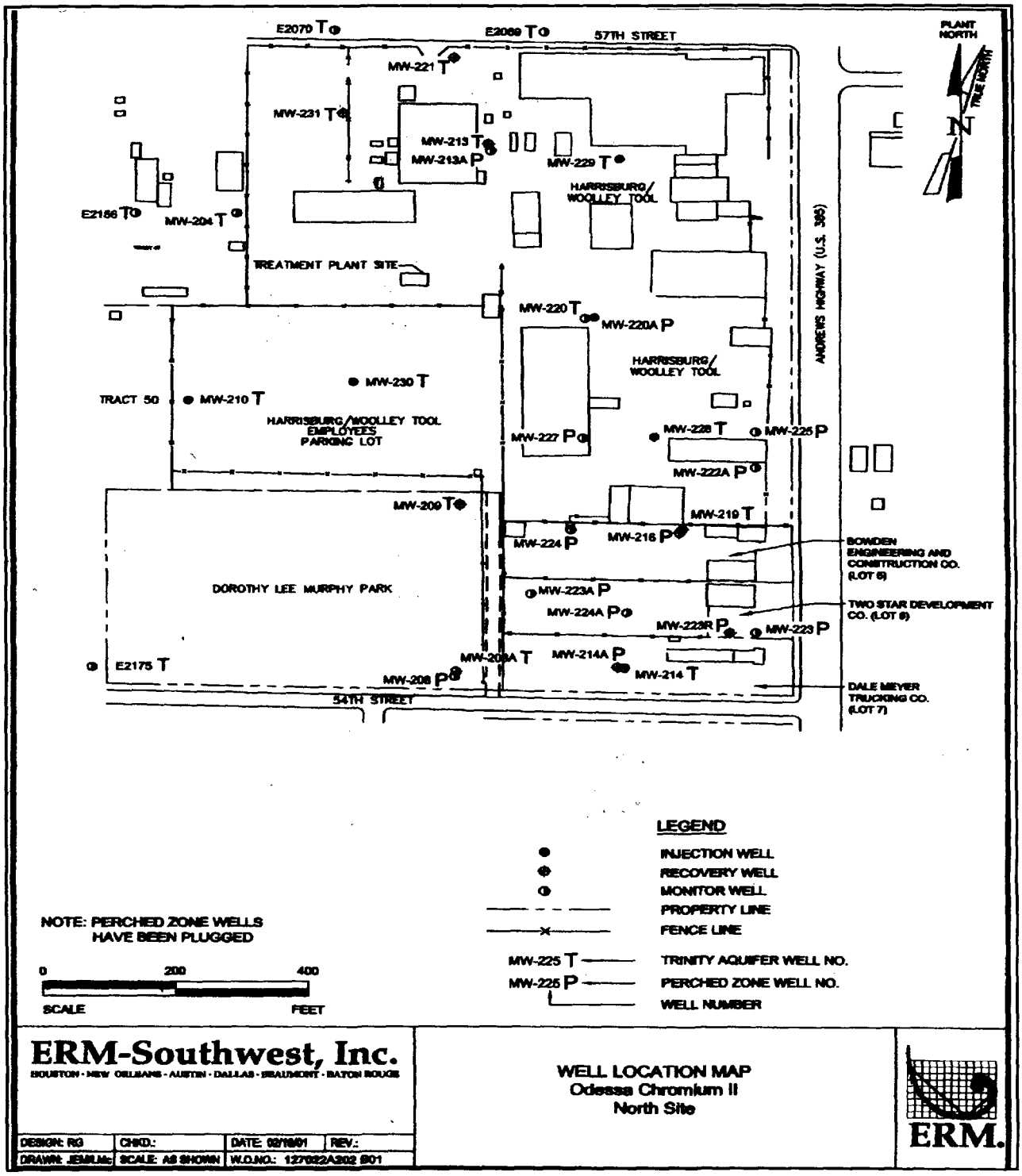
The 2nd Five-Year Review is scheduled for March 2006.

OTHER COMMENTS: None

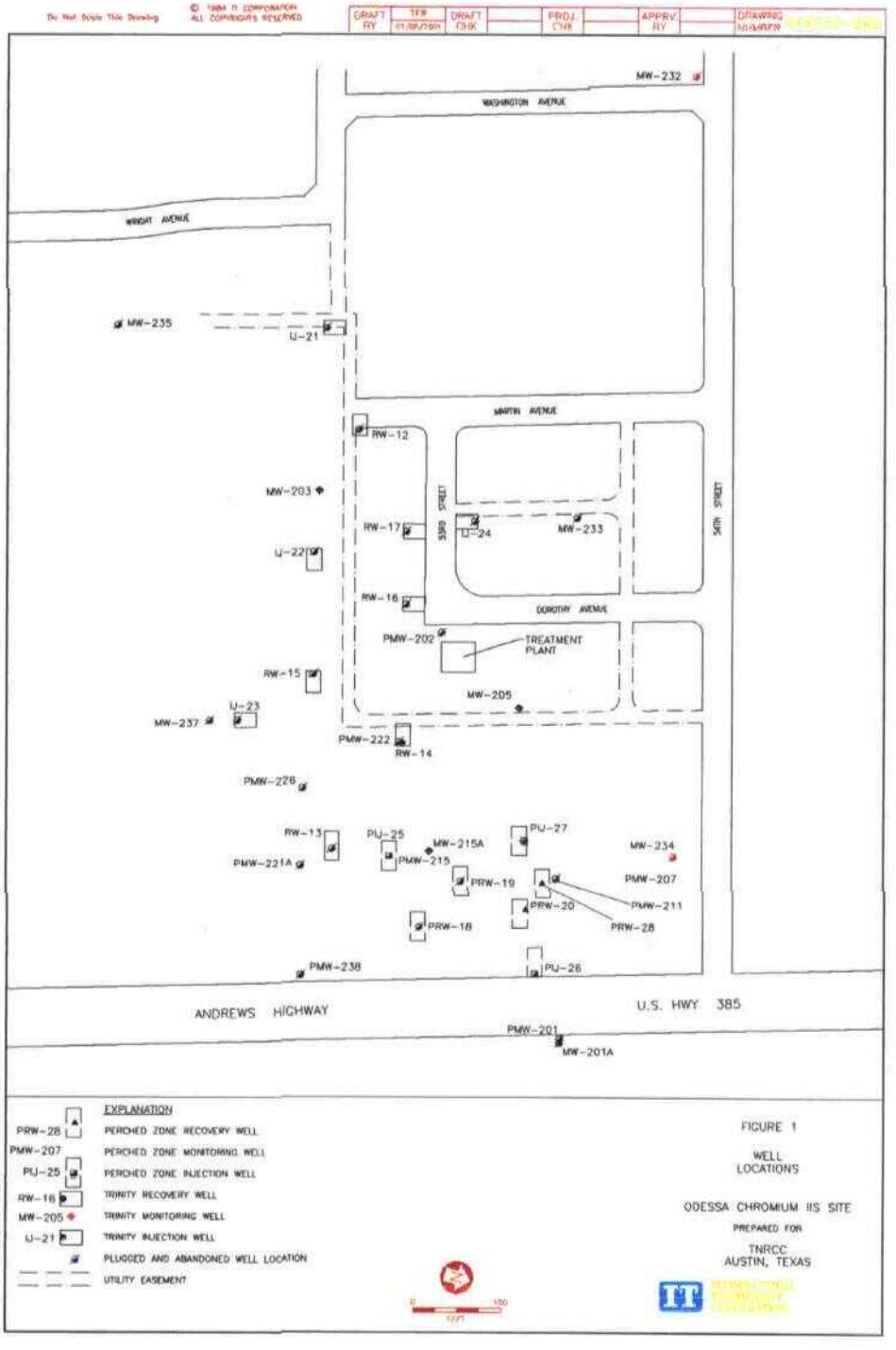
7.0 SITE MAP, CHARTS AND PLOTS

7.1 SITE LAYOUT MAPS

a. SITE LAYOUT MAP NORTH PLUME

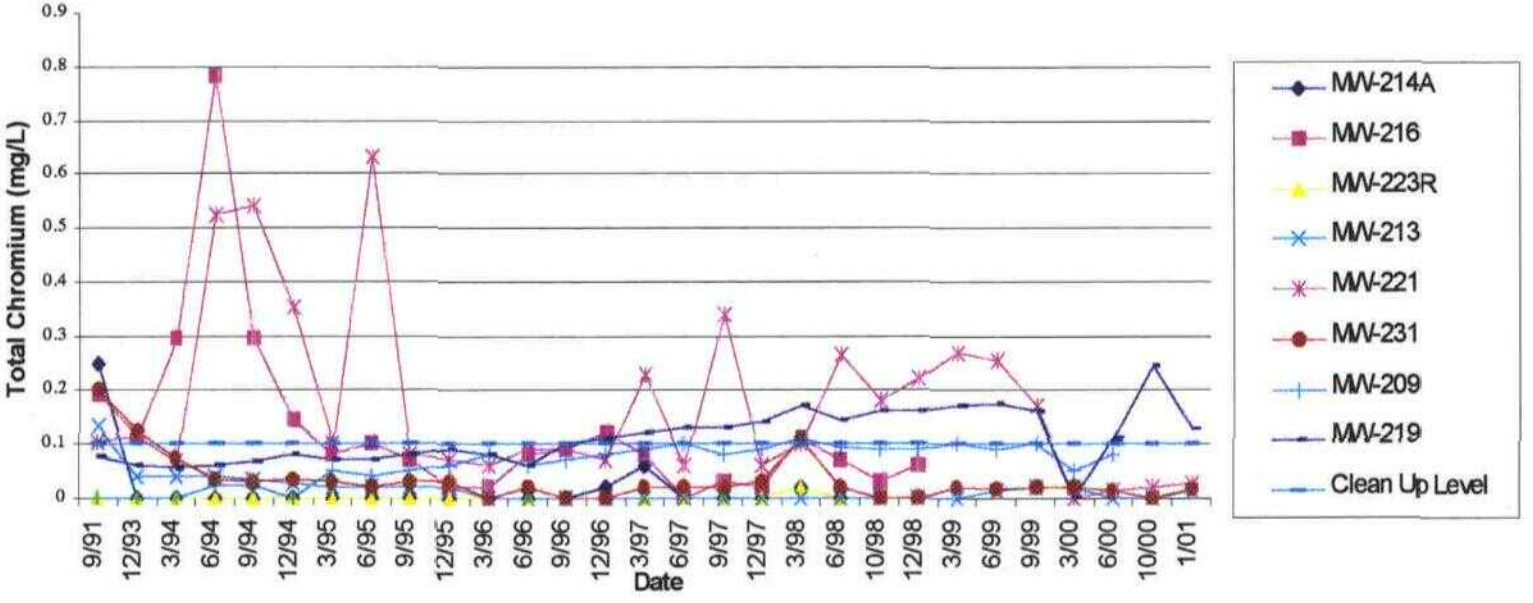


b. SITE LAYOUT MAP SOUTH PLUME

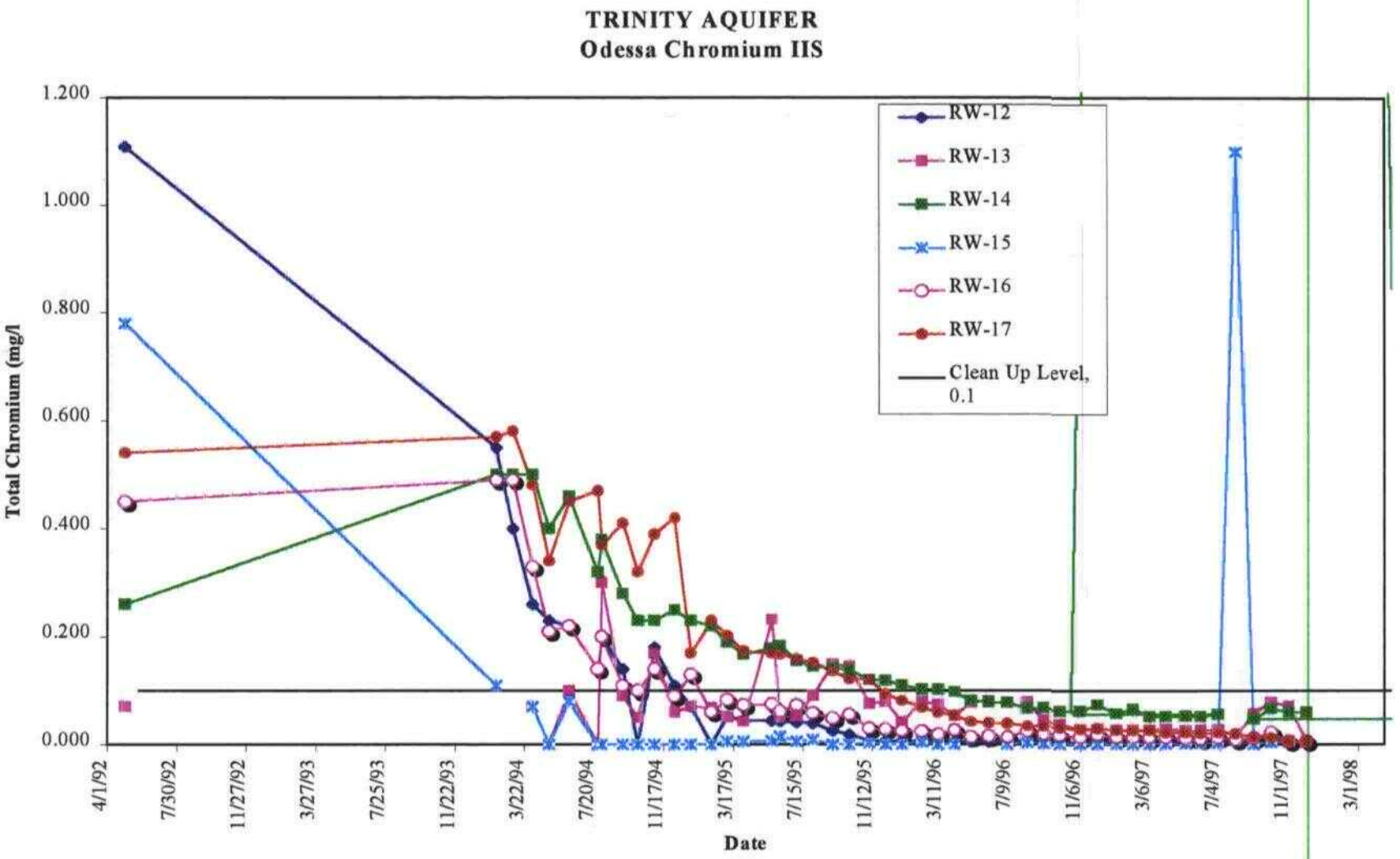


7.2 CHART OF CHROMIUM CONCENTRATION DATA OVER TIME

Figure 7.2A
Perched Zone and Trinity Aquifer Recovery Wells
Historical Chromium Data, North Plume
Odessa Chromium II N



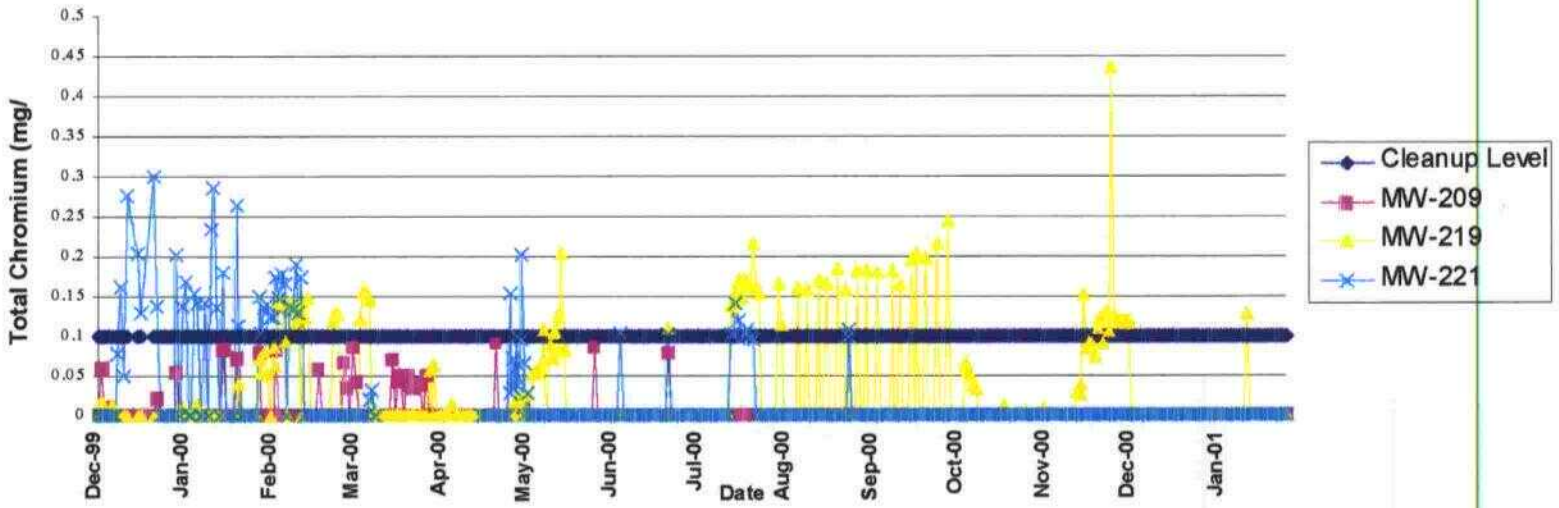
b. CHROMIUM CONCENTRATION DATA FOLLOWING FERROUS SULFATE TREATMENT, SOUTH PLUME



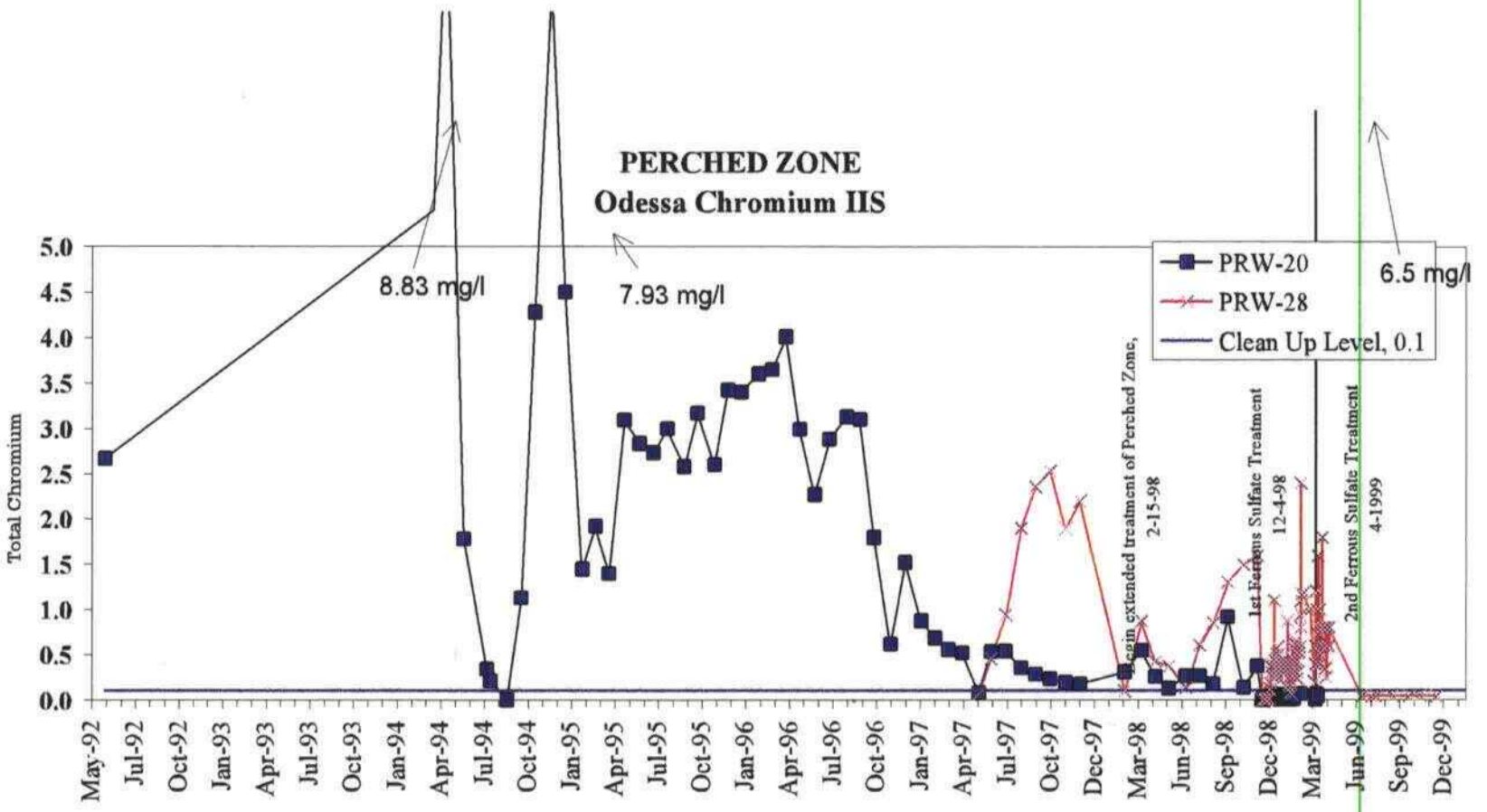
7.3 PLOTS OF CHROMIUM CONCENTRATION FOLLOWING FERROUS SULFATE TREATMENT

a. CHROMIUM CONCENTRATION DATA FOLLOWING FERROUS SULFATE TREATMENT, NORTH PLUME

Figure 7.3A
Chromium Concentration Data Following Ferrous Sulfate Treatment, North Plume
Trinity Aquifer



b. CHROMIUM CONCENTRATION DATA FOLLOWING FERROUS SULFATE TREATMENT, SOUTH PLUME



INTERVIEW #1 of 3

Five-Year Review Interview Record
Site Name: Odessa Chromium #2, South Plume, Superfund Site
Location: Ector County, Texas: **Individual Contacted:** Wade Howell, Field Site Engineer
Office of Howell Engineering, 409 East 57th Street, Odessa, Texas 79762
Subject: 5-Year Review Background Information Survey

Contact Made By:

Name: Ernest Franke Title: Remedial Project Manager Organization: US-EPA
Telephone No.: (214) 665-8521 *Street Address: U.S. EPA 1445 Ross Avenue, Suite 1200*
E-Mail: franke.ernest@epa.gov. City, State, Zip: Dallas, Texas 75202

Interview Questions

1. What is your overall impression of the work conducted at the site since beginning of continual treatment operations in November, 1993?

Response: The remedial ground water cleanup has been very good. The work has been conducted in a professional manner without negative comments or impact

2. From your perspective, what effect has the site operations had on the surrounding community?

Response: The cleanup has cleaned up the ground water so it may again be used by the citizen this without impact on the environment.

3. Are you aware of any community concerns regarding the site or its administration?

Response: No

4. Are you aware of any events, incidents, or activities that have occurred at the site, such as dumping, vandalism, trespassing, or emergency response from local authorities?

Response: No

5. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office, if applicable, regarding the site? If so, please describe purpose and results.

Response: yes Representative of our firm has made daily visits to the site. The purpose of the visit was oversight review.

6. Have there been any complaints, violations, or other incidents related to the site that required a response by your office, if applicable? If so, please give details of the events and results of the responses.

Response: None

7. Do you feel well-informed about the site's activities and status?

Response: yes

8. Do you have any comments, suggestions, or recommendations regarding the site?

Response: The overall site clean up has gone well, with no negative impact and satisfactory treatment results

INTERVIEW #2 of 3

Five-Year Review Interview Record
Site Name: Odessa Chromium #2, South Plume, Superfund Site
Location: Ector County, Texas: **Individual Contacted:** Uche Ikemba, PE Project Manager
Texas Natural Conservation Commission, P.O. Box 13087, Austin, TX 78711-3087
Subject: 5-Year Review Background Information Survey

Contact Made By:
Name: Ernest Franke Title: Remedial Project Manager Organization: US-EPA
Telephone No.: (214) 665-8521 *Street Address: U.S. EPA 1445 Ross Avenue, Suite 1200*
E-Mail: franke.ernest@epa.gov. City, State, Zip: Dallas, Texas 75202

Interview Questions

1. What is your overall impression of the work conducted at the site since beginning of continual treatment operations in November, 1993?

Response: Satisfactory

2. From your perspective, what effect have the site operations had on the surrounding community?

Response: Does not appear to have affected surrounding Community.

3. Are you aware of any community concerns regarding the site or its administration?

Response: No

4. Are you aware of any events, incidents, or activities that have occurred at the site, such as dumping, vandalism, trespassing, or emergency response from local authorities?

Response: No

5. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office, if applicable, regarding the site? If so, please describe purpose and results.

Response: Site visits by the TNRCC was weekly during construction, and quarterly during system O&M. for most

6. Have there been any complaints, violations, or other incidents related to the site that required a response by your office, if applicable? If so, please give details of the events and results of the responses.

Response: Not to my knowledge, none since June 2000.

7. Do you feel well-informed about the site's activities and status?

Response: Yes, I am well informed about site status

8. Do you have any comments, suggestions, or recommendations regarding the site?

Response: Recommendation; implement gw long-term monitoring plan. upon EPA's approved of plan.

INTERVIEW #3 of 3

Five-Year Review -Interview Record

Site Name: Odessa Chromium #2
North Plume, Superfund Site

Location: Odessa, Ector County, Tx

Individual Contacted:
Ronald T. Grimes
Project Manager
ERM-Southwest, Inc.
16300 Katy Freeway, Suite 300
Houston, Texas, 77094
(281) 600-1000

Subject: 5-Year Review Background Information Survey

Contact Made By:

Name: Ernest Franke, PE Title: Remedial Project Manager Organization: US-EPA
Telephone No.: (214) 665-8521 *Street Address: U.S. EPA 1445 Ross Avenue, Suite 1200*
E-Mail: franke.ernest@epa.gov. City, State, Zip: Dallas, Texas 75202

Interview Questions

1. What is your overall impression of the project (general sentiment) ?

Response: *The project is moving towards completion with a cooperative effort between the PRP and the EPA.*

2. From your perspective, what effect have the site operations had on the surrounding community?

Response: *As far as we know, there has been little community interest in the site. The most significant effect has been providing several users around the site with connections to the City of Odessa public water supply. Owners of those domestic wells used as monitor wells have been totally cooperative with the PRP during sampling events.*

3. Are you aware of any community concerns regarding the site or its operations and administration? If so, please give details.

Response: *None at this time. Earlier in the project, Bowden Construction was concerned that locating a recovery well on his property would interfere with his business operations. Those concerns have been alleviated because of the chosen location of the well, and his subsequent experience that his business operations have not been hampered by the well's operational, maintenance, or sampling activities.*

4. Are you aware of any events, incidents, or activities that have occurred at the site, such as dumping, vandalism, trespassing, or emergency response from local authorities? If so, please give details

Response:

a. *One monitor well was vandalized. Vandals broke the padlock and dropped short pieces of reinforcing steel into the well. Most but not all of the steel was fished out. The remaining steel did not hinder subsequent sampling events.*

b. *A broken line released hydrochloric acid onto the concrete containment compound. The acid eroded the concrete and spilled outside the compound. The plant operator on duty called the fire department emergency response team to assist in neutralizing the acid and controlling the extent of the spill. After the acid was cleaned up, the compound was rebuilt to include a separate lined chemical-resistant containment area for acid storage and handling.*

c. *The plant discharge line was vandalized. Vandals partially saw cut the bottom of the main plant discharge line and closed the pressure control valve. When the operator started the plant, treated water was sprayed into the compound. The line was repaired, all padlocks were changed, and no other damage was apparent.*

5. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office, if applicable, regarding the site? If so, please describe purpose and results.

Response: *Plant operators visit the site on a daily basis to operate and inspect the equipment and facilities. The operators are required to complete a four-page daily inspection log and send copies of it to the project manager on a weekly basis for review. Copies of those logs are included in the bi-monthly reports submitted to EPA.*

Either the project manager or his designee conducts a site visit at least once per month. The purpose of the monthly visit is to review site operations, conduct sampling events, or address special concerns that may have arisen during the course of the operation.

Each year, quarterly ground water monitoring events are conducted by the PRP and reported to EPA. The second quarter report includes an annual report and evaluation of the plant's performance.

6. Have there been any complaints, violations, or other incidents related to the site that required a response by your office, if applicable? If so, please give details of the events and results of the responses.

Response: *No.*

7. Do you feel well-informed about the site's activities and status?

Response: *Yes.*

8. Have there been any changes in State laws and regulations that may impact the protectiveness of the ground water or soil remedies? If so please address.

Response: *No.*

9. Has the site been in compliance with permitting and reporting requirements?

Response: *Yes.*

10. Do you have any comments, suggestions, or recommendations regarding the site's management or operation?

Response: *Communication and spirit of cooperation between the EPA RPM and the PRP has been excellent the last few years.*

Ronald T. Grimes, P.E.
ERM-Southwest, Inc.
Project Manager

March 20, 2001
Date